NON-PUBLIC?: N
ACCESSION #: 8808240355
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Calvert Cliffs, Unit 1 PAGE: 1 of 3

DOCKET NUMBER: 05000317

TITLE: Loss of Load Trip Due to Unclear Maintenance Procedure
EVENT DATE: 07/15/88 LER #: 88-006-00 REPORT DATE: 08/15/88

OPERATING MODE: 1 POWER LEVEL: 089

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: J.M. Osborne, Engineer TELEPHONE #: 301-260-4384

COMPONENT FAILURE DESCRIPTION:
CAUSE: D SYSTEM: SB COMPONENT: V MANUFACTURER: C635
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At 0305, July 15, 1988, Calvert Cliffs Unit 1 (89% power) tripped on Loss of Load when its turbine tripped. The turbine tripped when maintenance personnel improperly isolated level switches on #12C Feedwater Heater. The maintenance procedure used was unclear and, therefore, misinterpreted by the technicians.

During the trip recovery, operators discovered #12 Atmospheric Dump Valve (ADV) stuck open. It was manually isolated. The valve internals were inspected and repaired. The failure was caused by improper adjustment of valve stroke. All installed ADVs have been properly adjusted.

CORRECTIVE ACTIONS

1. Maintenance Planners will be trained in formulating clear maintenance instructions.

2. Specific instructions will be written for isolating instrumentation that could directly cause a reactor trip.

3. At the discretion of the shift supervisor, a briefing will be held

prior to performing directly trip-sensitive maintenance.

4. Directly trip-sensitive maintenance will be performed under the direction of a maintenance supervisor or senior maintenance individual.

5. Upper isolation valves for feedwater heater level switches capable of initiating a main turbine trip (feedwater heaters 11, 12, 21, 22) will be locked open.

(End of Abstract)

DESCRIPTION

At 0305, July 15, 1988, the Unit 1 Main Turbine (EIIS TA-TRB) tripped when maintenance personnel improperly isolated level switches (EIIS SM-LS) on #12C Feedwater Heater (EIIS SM-HX). Unit 1, at 89% power, automatically tripped on loss of load. While the Operators performed Emergency Operating Procedure (EOP)-0 (Post Trip Immediate Action), they noted Reactor Coolant System (RCS) (EIIS AB) temperature was not stabilizing. At 0320, they performed EOP-4 (Excess Steam Demand) and discovered #12 Atmospheric Dump Valve (ADV) (EIIS SB-V) stuck open. The #12 ADV was manually isolated; the RCS temperatures and pressures stabilized at 0338. The Reactor Protection System (RPS) (EIIS JC) trip that activated was the loss of load trip. This trip is for equipment protection and is not required for reactor protection. No Engineered Safety Features Actuation System (ESFAS) (EIIS JE) activated. Steam Generator Isolation Signal (SGIS) Block B was received because #12 ADV stuck open. SGIS Block A was not received so the SGIS ESFAS did not activate. Auxiliary Feedwater Pump #13 (EIIS BA-P) spuriously started one second after the reactor tripped. No Auxiliary Feedwater Actuation Start (AFAS) signals were received. No RPS or ESFAS system trips were manually activated.

PERSONNEL ACTIONS

Operator actions were proper and deliberate. Maintenance personnel actions contributed to the event (See CAUSE section below). The maintenance procedure (MO) used was unclear and, therefore, misinterpreted by the BG&E technicians. The work environment did not contribute to the event.

FAILURE INFORMATION

One equipment failure, #12 ADV, occurred during this event. #12 ADV valve internals were inspected. The inner plug had broken at the point where it threads into the valve stem. This allowed the plug to drop to

the bottom of the valve causing the valve to stick open while indicating closed.

The failure was caused by improper adjustment of the valve stroke. One other ADV was found to require adjustment.

ADV Manufacturer Copes-Vulcan
Model # D-100-100

CAUSE

Feedwater Heaters use steam extracted from various stages of low and high pressure turbines to preheat feedwater. Calvert Cliffs has six feedwater heater stages. Feedwater Heater #12C is one of three second stage heaters. The condensed extraction steam that collects in the feedwater heater is drained in a controlled manner to prevent the feedwater heater from completely flooding or draining. Turbine damage from a flooded feedwater heater is prevented by this controlled draining and a turbine trip activated by feedwater heater level switches (LS)-1456 and 1457 (see diagram).

On July 15, 1988, two BG&E maintenance technicians prepared to adjust the level transmitter (LT) - 1456 for heater #12C. The shift supervisor had approved this maintenance. The technicians and shift supervisor concluded it was prudent to isolate feedwater heater level switches (LS) 1456 and 1457 prior to adjusting the level transmitter. The reactor tripped when the technicians isolated the feedwater heater level switches improperly. The vague instructions did not specify how to isolate the switches or warn that improper isolation could trip the turbine.

This event was caused by unclear MO instructions which were misinterpreted by the technicians.

ANALYSIS

The loss of load event analyzed in Chapter 14.5 of the Final Safety Analysis Report (FSAR) assumes 100% power and a reactor trip on high pressurizer pressure 6.8 seconds after the loss of load. In this event, the reactor was at 89% power and tripped within one milli-second on loss of load. Therefore, this event was less severe than and bounded by the accident described in the FSAR. Calvert Cliffs experienced a similar event as noted in LER 85-012, but its root cause was different from the event described here.

CORRECTIVE ACTIONS

1. Maintenance Planners will be trained in formulating clear maintenance instructions.

2. Specific instructions will be written for isolating instrumentation that could directly cause a reactor trip.

3. At the discretion of the shift supervisor, a briefing will be held prior to performing directly trip-sensitive maintenance.

4. Directly trip-sensitive maintenance will be performed under the direction of a maintenance supervisor or senior maintenance individual.

5. Upper isolation valves for feedwater heater level switches capable of initiating a main turbine trip (feedwater heaters 11, 12, 21, 22) will be locked open.

ATTACHMENT # 1 TO ANO # 8808240355 PAGE: 1 of 1

CONDENSER #13
FIGURE OMITTED - NOT KEYABLE (DIAGRAM)

ATTACHMENT # 2 TO ANO # 8808240355 PAGE: 1 of 1

BALTIMORE
GAS AND
ELECTRIC

CHARLES CENTER . P.O. BOX 1475 . BALTIMORE, MARYLAND 21203

NUCLEAR OPERATIONS DEPARTMENT
CALVERT CLIFFS NUCLEAR POWER PLANT
LUSBY, MARYLAND 20657

August 12, 1988

U.S. Nuclear Regulatory Commission Docket No. 50-317
Document Control Desk License No. DPR 53
Washington, DC 20555

Dear Sirs:

The attached LER 88-006 is being sent to you as required by 10 CFR 50.73.

Should you have any questions regarding this report, we would be pleased

to discuss them with you.

Very truly yours,

/s/ L. B. RUSSELL
L.B. Russell
Manager - Nuclear Operations Department

LBR:JMO:tls

cc: William T. Russell
Director, Office of Management Information and Program Control
Messrs: J.A. Tiernan
C.H. Cruse

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